Regional Innovation Grant (RIG) WHITE PAPER
MONTANA REGION 1
Flathead, Lake, Lincoln, Mineral, Missoula, Ravalli and Sanders Counties
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INDUSTRY CLUSTER: ENERGY

Executive Summary

The energy industry in western Montana ranges from the traditional and stable utilities through more established alternatives such as solar. It also includes some preliminary exploration into other alternatives such as geothermal. A review of NAICS codes for regional businesses shows a wide variety in all counties and many small entities. Indications are that current and near future workforce needs will primarily be for replacement of an aging workforce, particularly for linemen. In the longer term plans for alternative development and replacement of transmission systems may open up a demand for different skill sets, customer service and skilled transmission construction workers. Most companies are in initial planning phases for this. It is recommended that workforce planning groups such as RIG continue to communicate with the energy industry in western Montana and monitor developments. As more concrete information is available planning groups consisting of workforce development, education, industry, economic development and community based organizations can develop a concrete response to workforce needs.

1. What entities make up this industry cluster in western Montana?

Utilities

- Mission Valley Power
  36079 Pablo West Road, Pablo
  Regulated electric distribution, transmission, energy supply within the boundaries of the Flathead Reservation36079 Pablo West Rd, Pablo, MT 5985536079 Pablo West Rd, Pablo, MT 5985536079 Pablo West Rd, Pablo, MT 59855

- Northwestern Energy, LLC
  40 East Broadway, Butte

The utility operations consist of regulated electric and natural gas distribution, transmission, energy supply and non-regulated electric operations. In addition, they are pursuing electric transmission and generation opportunities.

- Missoula Electric Cooperative
  1700 W Broadway, Missoula
  Provides electric service primarily in Missoula County and portions of Mineral and Ravalli Counties.

- Ravalli County Electric Cooperative
  Corvallis, MT
  Provides electric service to Ravalli County, south of Florence

- Flathead Electric Cooperative
  2510 US Highway 2 East, Kalispell, MT
  This electric cooperative is multimillion-dollar business that serves a variety of residential and commercial members with 3,800 miles of line, and serves the entire Flathead Valley and Libby, along with several hundred members along the Montana-Wyoming border.

- Northern Lights, Inc., (NLI)
  Sagle, Idaho, is a member-owned rural electric cooperative serving northern Idaho, western Montana and northeast Washington.

- PPL Montana
  Billings, MT
  PPL Montana owns and operates 11 hydroelectric projects that have a total generating capacity of 602 megawatts, as well as one reservoir. The facilities are located on the Clark Fork, Flathead, Madison and Missouri rivers and on West Rosebud Creek. PPL EnergyPlus currently serves about 80 percent of the large industrial and commercial customers in Montana who have chosen to buy their supply from the market.

- Avista Corporation (Primarily Sanders Co)
  Spokane, WA
  Avista Corp. is an energy company involved in the production, transmission and distribution of energy as well as other energy-related businesses. Over 50% of the power that Avista supplies comes from Montana. Eighty percent of that comes from the Noxon and Cabinet Gorge Hydroelectric Dams in northwestern Montana. Avista Utilities is our operating division that provides service to 352,000 electric and 311,000 natural gas customers in three Western states.

Pellet Manufacturers (pellet stove heat)

- Eureka Pellet Mill
  Superior, MT

- Western Bee Corp
  Polson, MT

Natural Gas

- Northwestern Energy Corporation (Branch),
  Kalispell, MT

- Avista Corporation,
  Sanders County, MT

- Jefferson Energy Trading, LLC
  Whitehall, MT

- Commercial Energy of Montana (Cutbank – no evidence of hire in Region 1)

- Croft Petroleum Co. (Highline company – drilling)

- Energy West Resources, Inc
  Great Falls, MT
  Developer and supplier of natural gas – serves Flathead, Missoula and Ravalli Counties

Alternative Energy/Bio Fuels

- Mission Valley Renewable Energy (new)
  54830 Hwy 93 S, Polson, MT
  Establishing a plasma-gasification plant to utilize bio-waste and old tires to produce alternative fuels

Solar

- Solar Plexus
  1605 Stephens, Missoula
  Installers of solar and hydro systems – residential and commercial

BioFuels

- AE Biofuels, Inc.
  109 S Parkmont Street, Butte (only one in the state)
  Integrated cellulose and starch ethanol demonstration facility in the United States. The 9,000 square foot demonstration plant will process a combination of feedstocks including various grasses, wheat straw, corn, corn stover (corn stalks), and bagasse (sugar cane stalks).

- Montana Renewables
  Missoula, MT
  Produces green "carbochemicals" or biomass chemicals. Derived from plant material, they replace petroleum based chemicals in many products from concrete to fabrics and pharmaceuticals. Glucaric acid, a biodegradable compound, is made from the raw sugars in corn syrup.

- Sustainable Systems
  Missoula, MT

An agricultural company focused on high-value culinary oil, biobased fuels, and bioproducts. Sustainable has initiated an expansion of its oilseed crush facility in Culbertson, MT (the "Montola" facility). The Montola facility is expected to double its current oilseed processing capacity to 600 tons per day after the expansion.

Other

- Wild Madrone LLC
  Flathead presence/office or residence only
  Great Falls, Montana
  San Francisco, California
  Boise, Idaho
  Email: request@wildmadrone.com
  Phone: (406) 727.2060
  Wild Madrone, LLC identifies optimal land assets for large-scale wind energy complex development, works with landowners and meteorologists to determine site capacity and project feasibility, and initiates the development process to achieve efficient, strategic results. We focus on sites with bountiful wind resources, good transmission line access and a high degree of land development potential. Wild Madrone maximizes the potential success of wind developments by partnering with wind developers, utilities and transmission companies to identify sites of mutual strategic interest.

A study of the Regional North American Industry Classification System codes indicates that industry exists in all seven counties of western Montana in the following energy related areas:

211 – Oil and Gas Extraction
212 – Mining, non oil and gas
214 – Support Activities for Mining
221 – Utilities
237 – Heavy and Civil Engineering Construction
324 – Petroleum and Coal Manufacturing
424 – Wholesale/Distribution
486 – Pipeline Transmission
562 – Waste Management and Remediation

2. What are the high impact organizations within this cluster and where are they located? Draw a "map" that helps us have some sense of "Region"

There appear to be 3 levels of activity in the energy field in Western Montana.

- Level 1: Stable and sustaining traditional buying and selling of energy supply, some growth potential, primarily electric utilities, hydro (currently most high impact)
- Level 2: Developing – energy alternatives such as solar, biofuel, Fuels for Schools

- Level 3: Preliminary stages of development with future potential – geothermal and conservation

HIGH IMPACT "MAP" of Current BUSINESSES BY LEVELS and NAICS codes:

Level 1
NAICS code 221/utilities
Present in **every county** in the Region

NAICS code 237/Heavy Construction
In **all counties except Mineral and Lake**

NAICS code 424/Distribution
In **all counties except Lincoln and Mineral** but served by other counties

Level 2
NAICS code 221/alternative

221119/Non fossil fuel electrical power only classified in Flathead County, however, most utilities are developing alternatives because of requirements to reduce carbon dioxide. These **impact all counties at some level** and may increase as those alternatives come on line.

Level 3
NAICS codes 221/237 for potential geothermal; sites identified in Ravalli, Sanders, Missoula and Lake Counties but future workforce demand uncertain. Currently in the developmental stage with no concrete projects approaching implementation stage yet.

From Montana Department of Environmental Quality:
The potential for geothermal development in Montana, and all Western states, continues to be assessed. The *DOE'S* ***GEOPOWERING THE WEST program has compiled information from such analysis, which indicates that Montana has more than 25,000 square miles of high-potential sites and areas.***

The current Montana Geothermal Project includes a variety of outreach activities to increase state and regional awareness of the economic opportunities for geothermal development. Outreach activities started in 2006 include a geothermal working group, presentations to regional and national energy groups and support of statewide project development efforts.

3. **From the perspective of entities involved, what is the condition of the industry now and why? From their perspective, what realistic growth opportunities exist?**

a. Utility companies: Stable workforce; sellers of energy to consumers – not energy developers or industry-industry marketers

Bonneville Power Administration - Gail Kuntz, Constituent Account Executive - Montana
Key issues the industry faces today include (in no priority order):

- Price volatility
- Growing demand (which may be moderated both by recession and new demand-side technologies)
- Rising market prices (energy costs)
- Rising prices for commodities such as steel
- Greater consumer interest in managing energy costs and use
- Aging infrastructure (especially transmission)
- Climate change initiatives that will alter the resource mix
- Concerns over energy independence and security (cyber, business continuity)
- Increased regulation, especially related to reliability
- Requirements for greater percentage of renewables in resource portfolios
- Access to capital

Despite these issues, the utility industry is more robust when compared to other industries. But it also faces major change, what some would call "transformation."

BPA Growth Opportunities:

The major growth areas will be those areas that support the new Administration's key energy initiatives – reduction of greenhouse gas emissions and energy independence. And, by association, grid reliability will be a major issue because of the need to integrate new resources. Expect to see a big surge in renewable energy (especially wind), energy efficiency and new technologies that make demand side management consumer-friendly (advanced metering technologies, Smart Grid, etc.). We already are seeing a huge influx of wind development.

Renewables:
Integrating new renewables (especially intermittent resources such as wind) into an already constrained grid will call for innovative solutions. The focus will be on grid expansion and the need to change federal and state laws to address obstacles to transmission siting.

Energy efficiency: Energy efficiency will likely lead to increased low-income weatherization, incentives for local utilities to increase energy efficiency programs, Smart Grid and green building.

Coal: Given that better than 50 percent of today's electricity comes from coal, FutureGen is back on the table. FutureGen is a DOE Clean Coal Demonstration Project and is supported by the president-elect's transition team.

Natural gas: While new technologies are in the works, considerable uncertainty remains about the pace of development and the viability of emerging technologies. In the interim, new natural gas-fired and other state-of-the-art resources may need to be developed as a bridge to the new technologies. This also will require the development of adequate natural gas infrastructure.

Nuclear: The jury is still out on what if any role nuclear power will play. It remains a polarizing subject.

Mission Valley Power

Stable work force; full training programs. Goal: develop opportunities for tribal members for stable, good-paying jobs. They "grow their own"

Northwestern Energy

Currently there is a need for additional baseload resources to serve continued load growth. Price volatility is a factor is a concern, as well as potential for future CO2 taxes. Hydro generation output is not nearly as reliable as previously portrayed. Renewables provide opportunity but the region is still working to determine how much these resources, such as wind, can be supported. In summary, the overriding theme is the uncertain environment in which resource decisions and acquisitions are taking place. There is tremendous risk and uncertainty confronting utilities. Northwestern approaches this environment as a utility with a recognized substantial resource deficit beginning in 2014.

b. Alternative energy development: These are the growth industries that will require a different brand of employee in the future and different skill sets that traditional utility companies. While the only operating company of those mentioned above is Sustainable Systems it maintains corporate offices only in our region and job growth is in eastern Montana.

Solar Plexus

Limited growth expected; they have had to spread out over many states to make a go of the business, only employ one person outside of owners. Tax incentives create a major concern for this business as it encourages less than qualified persons to enter the business with the risk of loss of quality and public opinion that it doesn't work. They recommend the German model for building the industry.

Mission Valley Renewable Energy (MVRE)

Pablo Estimated Opening 2010
Employee Needs – 60 FTE, 3 Shift Operation (Job Specific Skills/Training Needs Available 2/2009). Current Rough Estimates
7 – Engineering Level
7 – Midlevel engineering (associate engineering degrees)
5 – Sr. level management
30 – Materials Handing/Shipping Receiving
3 – Skilled Equipment/Maintenance
8 - Administrative

Northwestern Energy
As a result of the high level of uncertainty, regional utilities appear to be focused on the development of smaller scale renewable resources, DSM (demand side management), planned reliance on the wholesale market, and avoiding significant investments in new thermal generation. In addition, even though preferred portfolios contain pulverized coal, Northwestern will not pursue the development of pulverized coal until the carbon issue is clarified.

Avista Corporation
The energy industry is going through a transformation, the last 50 years the emphasis was on the quality and reliability of the product, prior to that it was electrification. Now the emphasis is environmental, particularly on how to reduce the energy carbon footprint. This emphasis is being driven by climate change. Since a full 1/3 of total energy consumption is used to light, heat and cool buildings, emphasis on reducing consumption will focus on greening of buildings or retrofitting buildings to be more energy efficient. This will require specific skills including engineers, architects, energy auditors, HVAC specialists, and research and development of new energy efficient products. As Smart Grids come on line potential for innovations increase as people can see where their highest use is on their homes. Smart Grids will also increase the number of information technology jobs in the industry as reports are generated and people and companies request those reports. Future jobs in energy include innovation, technology, installation, and marketing.

4. **What infrastructure is critical to this industry cluster as it moves forward?**

Mission Valley Power: Upgraded transmission lines; more availability from alternative (wind, etc) power

MVRE: Complete plant installation

Solar Plexus: recommends feed in tariff to grow the industry resulting in additional employment. Example from greentechmedia.com

The program would be similar to the one that has made Germany the world's largest solar market. Germany's feed-in tariff program requires the utilities to buy all the solar power generated by their customers at government-set prices. The prices are higher than those paid for conventional power, and they are locked into long-term contracts between the utilities and sellers.

As a result, many homeowners and farmers in Germany have installed solar energy systems on their rooftops or on the ground of their properties to profit from the lucrative incentives (see Solar Prices Set in Germany).

Bonneville Power Administration - Gail Kuntz, Constituent Account Executive - Montana

The nation has an aging transmission system, and some are even saying we no longer have a first-world system. New transmission will be needed not only to support reliability, but also to allow integration of wind power.

Transmission will be especially critical in the West, with its large geographic span, given that renewable resources often are located far from urban load centers. Coordination among state, local and federal agencies can expedite the planning, permitting and approval process to provide access to renewable and conventional resources while ensuring grid reliability. Tradable renewable energy certificates may be economically beneficial.

Changes also are needed in transmission systems and the operation of conventional generating resources to accommodate the inherent voltage and frequency fluctuations of intermittent resources such as wind and solar. Future technology advances in controlled demand response, electricity storage and better wind forecasting could help address these challenges.

Significant commitment to and investment in the research and development of low carbon generation resources and interactive grid technologies will be needed if the nation is to meet policy objectives.

Northwestern Energy
Transmission and baseload resources

Avista Corp.
Avista is investing and will continue to invest in new more efficient turbines for their dams, and in new transmission lines.

5. **Generally, what are the current skill sets employed in this industry? What skills/talents are needed to move the industry forward?**

Mission Valley Power: Job readiness to successfully enter training programs to include math skills – specifically algebra and trigonometry

Bonneville Power Administration - Gail Kuntz, Constituent Account Executive - Montana
Executives and managers of the critical occupations identified several common, cross-agency skills needed to achieve current and future business objectives. The common professional development skills most frequently mentioned included:

- Analytics
- Project management
- Problem-solving
- Oral and written communication
- Independent thinking
- Political savvy
- Leadership

- Policy analysis
- Business acumen (particularly BPA-specific)

*demand in our region will vary for these jobs

Solar Plexus
Industry Certification provided by NABCEP, the North American Board of Certified Energy Practitioners. Offers national credentialing and certifications for renewable energy professionals.

Mission Valley Renewable Energy
For Materials Handling/Equipment/Maintenance Personnel: Job Readiness in basic applicable skills – then short-term support for in-house, company/industry or specific on-job training

6. In an overall sense, what "gaps" do you see regarding this industry cluster and what ideas do you have about bridging those gaps?

Bonneville Power Administration - Gail Kuntz, Constituent Account Executive - Montana
BPA's Workforce Plan identifies occupations within the agency that are at risk due to changing skill requirements from retirements and competitive, dynamic business conditions. For the following critical occupations, BPA will aggressively mitigate workforce skill gaps via risk treatment plans, i.e. actions to be taken to mitigate critical skill gaps, during FY 2009:

- Critical Skill Experts in Power, i.e. experts in the fields of electric power marketing, scheduling, hydro operations, etc.
- Construction Inspectors, i.e. responsible for the construction and maintenance of the transmission infrastructure
- Transmission Lineman, Hourly Foreman, Chief Operators. The BPA apprentice program for linemen is 4 years long, and journey level linemen require some BPA-specific training.
- Natural Resource Specialists, i.e., plan, develop, and administer a vegetation management or control program, system, process, budget or practice. Desired degrees include biological sciences, agriculture, natural resource management and chemistry.
- IT Specialist
- Contract Specialist, i.e. contract administration for pre-award and post-award functions, including price/cost analysis, negotiation, and administration for services, materials, equipment and/or construction within a major spend category, organizational component, or in a geographical area associated with operating and maintaining a high-voltage electric utility industry.
- Power System Control (PSC) and System Protection and Control (SPC) Craftsman. Training programs are 2.5 to 4 years.
- Customer Support Services, i.e. responsible for customer billing and contract management and administration.

- Public Utilities Specialist, i.e. skills and knowledge concerning the business practices, rate structures and operating characteristics of public utilities. Duties required to perform this occupation are varied. Examples include: Analysis of utility rate schedules to determine their reasonableness and applicability; Investigation and analysis of the business management organization and financial structure of public utilities in connection with licensing or regulatory actions; and Purchase or sale by BPA of utility resources and services
- Electronic and Electrical Engineer (includes PSC/SPC Field Engineers)
- HR Specialist
- Substation Operator. Training for this position is extensive, requiring a 3.5 year internal training program, and even journey level recruits require at least 18 months in training.
- Senior Executive Service
- Managers
- Risk Analyst, i.e. experience in using structured risk assessments to identify and analyze a variety of potential of enterprise risks.

Northwestern Energy

Primarily service and maintenance in our area. Not anticipated to have high growth or substantial change in numbers of workforce. No current job listings on web site. Workforce needs primarily will be concentrated in replacement for retiring lineman. *Western Montana's In Business Monthly* reports that Northwestern Energy's Mike O'Neill estimates that linemen will be needed at a graduating rate of 50 per year for the next 10 years to fill gaps at the current rate of retirement. This resulted in the development of the lineman program at MT Tech. The Montana Tech lineman pre-application states that this program "was developed in response to a nation-wide shortage of skilled line workers. A recent survey of the Montana utility industry indicates that there will be a significant need (40-50 new apprentice positions per year) for individuals holding skills offered by this training for at least the next decade, and the industry expects that this trend will continue for the foreseeable future." The program started in 2007 was initiated by Northwestern Energy when they realized that upcoming retirements would result in leave a skill gap in the transmission field.

Flathead Electric Cooperative

Current and projected shortages are in lineman and engineer positions. They currently have an in house training and development apprenticeship program for linemen. Stephanie Wallace from Human Resources indicated that they are fortunate to live in an area that can attract linemen from other areas so that has helped their recruitment. FEC is coordinating with the universities to promote engineering internships leading to employment.

7. Find a success story and be prepared to tell us about it.

ESTEC -- Energy Systems Technology Education Center -- Created through National Science Foundation grant to Idaho State University, will be incorporated into MSU campuses in MT and Little Big Horn College at Crow. Their mission is to "cultivate the

people, educational resources and applied research capabilities necessary to improve the local, regional and national availability of trained workers in support of the construction, operation, and maintenance of current and future energy facilities and occupations." The project demonstrates unique collaboration with numerous entities giving financial and technical resources. These include business, community groups, education, state agencies, economic development organizations and tribal agencies. The program includes capacity building (math, science, etc. curriculum) at the six other tribal colleges in MT).

http://isu.edu/estec/

The **Montana Tech lineman program** is one such success story where government, education, and business partners joined forces to meet a workforce need. Click on the following link to read about the program, its establishment and it cooperators.

http://mtinbusiness.com/inbiz-0801/bus08.php

BPA: In early December, BPA signed power sales contracts with its customers that will ensure the Pacific Northwest has access to the nation's lowest-cost, emissions-free electricity for at least the next 20 years. Signing contracts now gives utilities a clear signal about what power they can expect from BPA over the next 20 years and what they need to acquire themselves to meet growing population and commercial/industrial needs in the future. The availability of low-cost electricity has always been a cornerstone of the region's economy, and its continued adequacy is critical to spurring much needed economic expansion.

While the Pacific Northwest, with its hydropower base, already has the cleanest electricity in the nation, the new contracts have been designed to facilitate further development of energy efficiency and renewable power. Utilities will not lose any access to low-cost federal power if they invest in conservation resources. The contracts also promote regional resource adequacy and encourage development of electric infrastructure in the region.

Resources:
http://www.deq.state.mt.us/energy/geothermal/sites.asp

http://www.workforceflorida.com/banner_center_energy.htm

http://hotjobs.yahoo.com/career-articles-the_new_power_jobs-449

http://www.pseg.com/media_center/pressreleases/articles/2008/2008-06-27.jsp

http://www.cewd.org/media/pdf/cipreport_nov2006.pdf

http://www.nabcep.org/?EXTKEY=I72RSHA

http://montana-renewables.com/default.aspx